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In preparing this final report, we decided to take the position of the essayist rather than the chronicler. The work on adaptive motivation theory was intended to be preliminary, exploring the possible advantages of a reconceptualization of motivation theory. In this report, we see our goal as introducing some lines of speculation, sampling some recent research that gives rise to that speculation, and presenting specimens of new theory and research designs and, ultimately, persuading the reader to pick up the burden of a novel idea or approach and to carry it some distance for us. In a sense, we would like to act as idea entrepreneur. Various technical and quarterly reports have detailed the development of questionnaires and methods of measuring components of adaptive motivation theory. It is fair to say that the original conceptualization of adaptive motivation theory has not been supported. We can identify certain consistencies in the manner by which individuals describe their motivational frameworks. Nevertheless, this consistency is not strong over time nor is it completely coherent within occasions. As a result, we have concluded that more conceptual work is necessary. In this report, we identify the nature and extent of that conceptual work. In effect, we suggest that it may be valuable to explore more deeply the cognitive roots of many of the current approaches. Through such an exploration, it may be possible to develop a set of middle range theories capable, in aggregate, of explaining motivated behavior. *Keywords:*

In accepting the challenge of the essay, we readily recognize and admit to some limitations. The research that we describe has been chosen because it supports or illustrates some a priori positions that we hold.

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The report was not intended to be nor should it be considered an inductive exercise in which propositions follow closely from careful reviews of limited research results or our own empirical work. If anything, the process worked in reverse. As a result of our ONR research, we refined some of our original propositions and looked around for research or independent theory that agreed with those ideas. The propositions that we explore have been carved from many years of reading and research in the area of work and general motivation so they are something more than the stream of consciousness overflowing its banks.

There will be three major sections to the report. The first section will present a rough taxonomy of motivation theory that will be used in later sections. In addition, this section will deal with the some general issues relating to the development and testing of current theories of motivation. The second section will deal with the extent to which the cognitive revolution in psychology that began in the early 60's has overtaken motivation theory generally, and work motivation theory in particular. The third section will consider motivation theory from the perspective of the behavior it purports to explain. We have used the label "middle-range theories" to describe this section. The label was taken from a recent book by Pinder (1984) in which he argues for smaller theories of motivation. We agree and try to demonstrate that these middle-range theories can be linked to particular dependent variables.

The diversity of material to be covered in these three sections is intimidating to author and reader alike. Nevertheless, it is our feeling that this diversity also increases the probability that we can stimulate and inform the reader. Most of the points that we raise in this report

represent "itches" that we have endured for many years now - they need to be scratched and this report is a good opportunity to do just that. As Karl Weick mused in a convention paper presented many years ago "How do I know what I mean until I see what I say?" We feel the same way. It is our hope that we will be able to clarify our own thinking in the course of developing these multiple topics for the reader.

One final note of caution. We assume that the reader is generally familiar with motivational literature and will, as a result, often assume such general familiarity in our discussions of a particular point.

### The Current Status of Motivation Theory

#### Definitions

The construct of motivation has been the subject of some dispute for decades. By many, it is considered to be a critical component in understanding and predicting human behavior. By others, it is considered to be redundant, addressing processes already covered by constructs such as perception, learning, or various physiological states. By still others, the construct of motivation is considered nothing more than a default construct, invoked whenever there is variance in behavior left to explain. Kleinginna and Kleinginna (1981) have gathered no fewer than 140 definitions of motivation that have appeared in the literature. Some of these definitions are hopeful and others are skeptical. For example, Vroom (1964) defines motivation as "a process governing choices made by persons or lower organisms among alternative forms of voluntary activity", an admiring definition. On the other hand, Bolles (1975) suggests that "motivation seems to be neither a fact of experience nor a

fact of behavior, but rather an idea or concept we introduce when we undertake to explain behavior". This definition places the motivation construct in the role of a heuristic device, useful for communication but little else. In a decidedly more negative vein, Dewsbury (1978) proposes that the "concept of motivation tends to be used as a garbage pail for a variety of factors whose nature is not well understood"

If we were to consider all of the parameters that enter into the many definitions of motivation, five would emerge as primary. These parameters are initiation, direction, intensity, persistence and termination. In other words, most definitions (and theories) of motivation deal with one or more of those aspects of behavior. As you might expect, definitions of motivation are often closely tied to theories of motivation. If one accepts a particular definition of motivation, one then proceeds to develop or accept a theory and examine variables that are compatible with that definition. For example, if you accept the definition suggested by Vroom above, it is clear that the process of choice will play a central role in your theoretical allegiance as well as exert an influence in any experimental design used to investigate that theoretical position. Of course, the opposite may be true as well: if you favor a particular implicit or explicit theory of motivation, you will be more likely to accept a definition which is compatible with that theory. To use the Vroom example introduced above, if you accept an expectancy approach to motivation, you will be less concerned with the parameter of persistence than you will with that of direction. Maslow, on the other hand, was primarily concerned with the issue of initiation of behavior. He suggested that motivation could be defined as a "desire or want or yearning or wish or lack" (Kleinginna

and Kleinginna, 1981). As a result, if you are inclined to accept Maslow's notions, you are less interested in the choice aspect of behavior than you are with the conditions surrounding the initiation or termination of any behavioral sequence. As we will see later in this essay, various theories of motivation have tended to emphasize one or another parameter rather than several or all of them. This has led to a certain parochialism in motivational research and has often transformed discussions of alternative motivational viewpoints into useless exercises in trying to add apples and oranges. How can one test the relative merits of Maslow's theory vs. Vroom's theory when individuals are asked only questions regarding choice among alternatives or only questions concerning the extent to which their social needs are being met?

For present purposes, we will suggest a definition of motivation that is a composite of those of Campbell and Pritchard (1976) and Vinacke (1962): Motivation concerns the conditions responsible for the initiation, direction, intensity, persistence and termination of a behavioral sequence. In other words, it is being suggested that there are a number of independent parameters to what we accept as motivated behavior. One of these parameters is initiation, another direction, etc. You will see that this multiple component definition fits nicely with the notion of middle-range theories. The implication is that some theories address the initiation and termination of behavior, other address the persistence and intensity of behavior and still others address the direction of behavior. No one theory is suited to an understanding of all of the parameters of motivated behavior.

#### A Working Taxonomy

Since there are literally dozens of motivation theories, a necessary first step in discussing them is to develop some clusters or groups of similar theories. We propose a five cluster working taxonomy with the following categories: Need Theory, Reinforcement Theory, Balance Theory, Expectancy Theory and Goal Setting Theory. This taxonomy has been useful in earlier reviews of motivational theory and research (Landy and Trumbo, 1976; Landy and Trumbo, 1980; Landy, 1985). These five categories are sufficient for including most of the research and theorizing that characterize modern motivation theory. It will also prove useful for later sections of this report by helping to illustrate trends in motivational research with respect to variables studied. We are not arguing that the taxonomy is definitive, only helpful for present purposes.

#### Need theory

Need theory is characterized by propositions that imply an organismic state (either inborn or acquired) that compels action. Most need theories assume that humans possess a set of characteristics (biological and/or psychological) that help to define intentional behavior through their manifestation at various times and in various situations. Thus, need for achievement and fear of failure (McClelland, 1955; Atkinson, 1964), need hierarchies (Maslow, 1943), ERG theory (Alderfer, 1972) and Motivator/Hygiene theory (Herzberg, Mausner and Snyderman, 1959) are all examples of need theories. They all assume that individuals have a fixed set of biological and/or psychological needs that must be met in order to create positive emotional states or eliminate tension.

#### Reinforcement theory

Variously known as incentive theory, S-R theory, the associationist approach, behaviorism or reinforcement theory, this groups of theories includes those approaches which pay particular attention to the identification of rewards and punishments in the environment and the extent to which these rewards and punishments are (or could be) tied to particular patterns of behavior. The best known of these approaches is the radical behaviorism of B.F. Skinner (1938;1959) but there are less radical approaches as well including cognitive behaviorism (Mahoney, 1974) and Social Learning theory (Bandura, 1969). Thus, it is assumed that various aspects of behavior that have been identified as characteristics of motivation (i.e. choice between alternatives, intensity of responding, resistance of responding to extinction) can be best understood by identifying rewards and punishments that covary with the behavior in question (or did covary at some earlier point in time). The term motivation is seldom used in the reinforcement paradigm. It is considered superfluous and misleading. Nevertheless, most reinforcement oriented theorists, researchers and practitioners are interested in the same aspects of behavior that intrigue motivation theorists.

#### Balance theory

Balance theory is a more heterogeneous category than either need or reinforcement theory. It derives from propositions related to cognitive homeostasis such as Festinger's cognitive dissonance theory (1957). The motivational thrust of this theoretical position is that mismatches among behaviors, among cognitions, or between a cognition and a behavior can result in tension. This tension is thought to have energizing (and thus, motivating) properties. By far, the most popular version of balance theory in the applied arena has been equity theory. Equity



theory (Jacques, 1961; Adams, 1956) proposes that individuals seek to achieve or maintain a balance between their perceived inputs and outcomes in a given situation. Another example of balance theory would be self-consistency (Korman, 1971) or self-perception theory (Bem, 1970). These latter theories suggest that individuals attempt to balance their own view of themselves with the view that others hold of them. In the broader context of adjustment, this balance would be similar to the mechanism that Carl Rogers' (1951) proposes as the motivational underpinning of adjustment/maladjustment continuum. Discrepancies (or imbalances) imply intentional or motivated behavior. Most current versions of this approach are heavily social in orientation, suggesting either directly or indirectly that other people (real or idealized) play a major role in motivated behavior.

#### Expectancy theory

As was the case with reinforcement theory, expectancy theory has many aliases. It may also be referred to as valence theory, instrumentality theory, VIE theory, utility theory, or value-expectancy theory. The expectancy perspective, proposes that a good deal of behavior can be understood if we assume that individuals are, for the most part, rational and seek to maximize gains while minimizing losses. Early propositions of Rotter (1955) and Peak (1955) were joined by Vroom to form what has become known as VIE (valence, instrumentality, and expectancy) theory (1964). This approach suggests that individuals are likely to experience greater force to behave in a way that would seem to provide them with valued outcomes. Valence is related to the primary attractiveness of an outcome, instrumentality is related to the secondary attractiveness of an outcome (i.e. the extent to which one

outcome of lesser value is tied to another outcome of greater value) and expectancy is associated with any one of several beliefs that an individual holds regarding the association between particular actions and particular rewards. This theoretical approach is highly cognitive in orientation and implies that individuals calculate the desirability of various outcomes and act accordingly.

#### Goal setting theory

Goal theory is based on the proposition that if an individual develops or accepts a goal or an end state, behavior will be channeled toward meeting that goal or achieving that end state. The goals are seen to have directing and energizing properties. The primary advocate of goal setting theory has been Locke (Locke, Shaw, Saari and Latham, 1981). In earlier years, the research and theoretical propositions had been predominantly process oriented and mechanistic. More recently, the theoretical development has been favoring various cognitive and information processing mechanisms (Locke et al, 1981).

These five basic orientations have waxed and waned in popularity at various times during the last 30 years. Need theory was very popular in the earlier periods but has lately fallen on hard times. Reinforcement approaches were quite active in the late 60's and early 70's but have been receiving less and less attention in theoretical discussions. Balance theory (particularly equity theory) had its major impact in the late 60's and early 70's as well and has been gradually diminishing in attractiveness. VIE theory reached a peak in the mid 70's and has remained a vigorous and demanding presence. Goal setting propositions have only recently achieved full theoretical status (Locke et al, 1983)

and would seem to be on the rise for the next several years in terms of both conceptual interest and research activity.

### The "one best" theory

If one were to examine the current research or theoretical literature in motivation, the preponderance of writings would fall (more or less) into one of the five categories above. Herein lies a problem. Pinder (1984) has referred to this problem as the tendency to seek universal applicability. It is generally assumed that one of these approaches is "right" and the others wrong, as if these theories were in competition with one another. This is not particularly surprising given the traditional operations of the scientific method. It is common to pit competing hypotheses against each other in investigation. Unfortunately, this tendency has not been of much benefit in the area of motivational theory and research. This is true for at least three reasons. First, there have been few truly comparative studies of theoretical positions. With the exception of the Menlo, Cartledge and Locke (1980) comparative examination of need theory, expectancy theory and goal setting theory, most "comparative" tests of theoretical propositions have involved empirically testing the propositions of one approach while disparaging the logic or data supporting the alternatives approaches. A second reason for pessimism with respect to this competitive universalist approach to the development of motivation theories is the fact that the competitive environment has made the advocates of one approach reluctant to consider any of the propositions of other "competing" approaches. It should be obvious to any careful reader of research on these various approaches that there is a grain of truth in each approach. As Maslow suggests, we do not worry about social relations when we have an empty

belly; all of us recognize that we are more likely to perform an action that has been previously rewarded; who among us has not felt cheated on occasion and vowed to get even?; we seldom engage in low probability, low payoff activities; things to do lists (i.e. list of goals) are compelling to most of us. In other words, common sense tells us that now of these approaches is likely to be completely wrong. Nevertheless, we are often asked to accept one and reject all others.

The third pitfall in the universalist approach has been the necessity to account for all "motivated behavior" from the particular theoretical perspective under consideration. Thus, every behavior from a simple one such as arriving for work on time to a complex one such as deciding to change jobs is dragged (often reluctantly) under the universalist umbrella. In fact, the result has been that various approaches have publicly proclaimed the capacity to explain motivated behavior yet narrowed their consideration to particular subsets of behavior such as occupational choice, or absence, or persistence or productivity.

#### Summary

It appears to us that progress in determining what role motivation might play in understanding behavior will depend on reorientation of thinking and research. Until recently, the thrust in motivational research has been to find the "correct" theory. Presumably, we will know when we find it because it will be capable of describing all of the conditions that influence each of the five parameters of motivation behavior (i.e. initiation, direction, persistence, intensity and termination). We think that this search for the holy grail will continue to frustrate students of motivation. It is time to stop designing new

mousetraps and make use of the ones we have. A good place to start is with a consideration of the cognitive revolution in psychology and the extent to which it has influenced motivation theories.

### Cognitive Components in Theories of Motivation

In the mid 1960's, a cognitive wave engulfed virtually every substantive area of psychology. Developmental psychology was captivated by Piaget; verbal learning became psycholinguistics and was heavily influenced by the notions of Chomsky. Clinical psychology moved away simultaneously from Freudian theory and behavior modification and toward cognitive diagnosis and therapy. Even radical behaviorists deserted to the cognitive camp by considering processes such as self-control, modeling and social learning. It is not surprising then that motivation theory was similarly transformed. The predominant motivational paradigm to that point had been need theory of one variety or another. In the area of work motivation, this meant either Herzberg's two factor theory or Maslow's need hierarchy. It is interesting to note that in spite of the fact that Georgopolous, Mahoney and Jones (1957) had sketched the mechanics of expectancy theory (calling it path-goal theory) some seven years prior to the publication of Vroom's expectancy theory of work motivation (1964), the publication precipitated no major shift toward the cognitive approach. The more general cognitive revolution was not quite underway at that point. Prior to Vroom's book, there had been little use for words such as "planning" or "intention". Equity theory and expectancy theory changed that. Both of these approaches proposed that individuals were capable of calculating costs and benefits and further, that individuals used the results of those calculations to

choose among alternative courses of action. To the extent that choice precedes action, this meant that behavior sequences were controlled by comparative evaluations of costs and benefits. Although equity theory relied more heavily on social comparison than expectancy theory, both implied that cognitive processes were major determinants of motivated behavior. Since that time, a good deal of research has confirmed the importance of cognitive variables and processes in motivation. In this section, we will briefly review recent research that highlights the role of cognitive variables in several of the motivational approaches in the taxonomy presented earlier. Although it would be possible and possibly profitable to consider the implications of cognitive theory and research for all five approaches, that is a luxury afforded by unlimited space, a luxury we do not have. As a result, we will be selective in our treatment of the approaches.

#### Need Theory

In 1972, Alderfer suggested a revision of Maslow's need hierarchy theory. This revision involved modifications of both process and content of Maslow's theory. The process modification was an expansion from a straight satisfaction-progression mechanism (Landy, 1985) to one that also included a frustration-regression mechanism. In Maslow's model, if one is frustrated at a particular need level, one stays at that level until the need is satisfied. Once the need is satisfied, the individual progresses to the next level of the hierarchy. Unfortunately, empirical research has failed consistently to confirm this mechanism (e.g. Lawler and Suttle, 1972; Hall and Nougaim, 1968; Rauschenberger, Schmitt and Hunter, 1980). Alderfer proposed a more complex mechanism involving both satisfaction-progression and frustration-regression components. In

effect, Alderfer suggested that when an individual becomes frustrated at a particular need level, the individual might regress to a lower level and find a relief of tension in the successful satisfaction of needs that had been previously satisfied. In addition to this process modification, Alderfer also suggested that instead of the five need level of Maslow (physical, safety, love, esteem, self-actualization), a more appropriate hierarchy would be based on three need levels (existence, relatedness and growth).

Unfortunately, Alderfer's theory has not received much more empirical support than Maslow's. From the cognitive perspective, however, Alderfer's theory was a radical step forward. In addition to compressing Maslow's five levels into three, Alderfer suggested an underlying continuum for these three levels. He suggested that the higher level needs were more abstract and the lower level needs more concrete. This higher level of abstraction implies uncertainty and ambiguity. This underlying cognitive continuum provided a rationale for the frustration-regression mechanism. When an individual was frustrated in satisfying a particular need, the individual would move "back" to a less cognitively demanding task. While such an underlying cognitive continuum might have been plausible (and even implied) in the Maslovian framework, Alderfer was the first to suggest this continuum directly.

A recent study by Veroff, Reuman and Feld (1984) has provided some support for the notion of a relationship between need levels and cognitive states. In a study of the stability of motives in men and women from a life-span perspective, Veroff et al. found evidence to suggest that uncertainty in work settings might lead to an emphasis on affiliation motives. In other words, the more uncertain the environment,

the more likely it was for individuals to exert effort in developing and maintaining social relationships. It may be that these relationships provide an improved opportunity to gather information via social comparison and thus reduce uncertainty. The Veroff et al. data are compatible with the frustration-regression mechanism that Alderfer suggested. Although these data do not directly address the issue of a hierarchy of motives, they do support a possible relationship between motive salience and cognitive state (i.e. uncertainty).

The second issue raised by Alderfer via his revision of Maslow's theory concerns the number of need levels. Alderfer (and others) sought to identify the "correct" number of levels, as if every individual functioned from such a hierarchy. This can be seen as another variation on the "universalist" theme described earlier (Pinder, 1984). What if this were not true? What if different individuals had structurally different hierarchies? It is reasonable to assume that individuals group stimuli and form concepts to take the place of individual stimulus elements in their environments (Landy and Becker, 1983). To the extent that grouping does occur, it makes sense to think of "needs". But rather than think of them as hard-wired biological and/or psychological mechanisms, it might be more useful to think of these groups or clusters of elements as manifestations of cognitive operations of the individuals being studied. It may very well be that some people use five categories for clustering potential rewards (as Maslow suggested) ; others might use three categories (as Alderfer suggested); still others might use only two categories (as implied by Herzberg). From a cognitive perspective, it is important to know two things: 1) how many categories (i.e. concepts) do individuals use in decomposing their reward



environment, and 2) how are these categories arranged on a concrete to abstract continuum. The answers to those two questions could provide a new cognitive "spark" to the investigation of need theories of motivation.

### Balance Theory

Equity theory continues to be one of the more popular versions of balance theory in the area of work motivation. As we indicated earlier, its theoretical roots can be found in the cognitive dissonance propositions of Festinger. Thus, it is not surprising that cognitive mechanisms would hold the key to future development of the theoretical approach. In the last several years, three particular lines of research have suggested novel avenues for extension of the theory.

### Moral Maturity and Equity Theory

The first line of research is illustrated by the work of Vecchio (1981) on moral maturity. Equity theory implies that people are capable and willing to perceive fairness in their immediate environment. This may be an unwarranted assumption. In terms of cognitive ability, fairness calculations can be difficult. These calculations usually involve comparing two very different types of variables or metrics. When an individual compares input and outcome, consider what is being done. Input includes things such as ability, effort, and training. Outcome includes such things as monetary rewards, praise and improved promotional opportunities. What type of transformation is necessary before inputs can be compared to outcomes? How many "units" of effort or ability are necessary warrant praise or a promotion or a \$100 bonus? The rules necessary to make such transformations are quite complex and often involve using the experience of other individuals as a heuristic device

to aid in this calculation. In other words, comparing ourselves to others might be a form of "poor man's calculus". In fact, some recent research has shown that many equity calculations are difficult or impossible for most pre-adolescents. Piaget ( 1970) anticipated such difficulties in his observations of the various stages of cognitive development. His theory proposes that most equity calculations fall in the realm of formal operations and that such operations may not be carried out efficiently by all adults.

Vecchio reasoned that in order for equity predictions to hold for an individual, it would be necessary for that individual to have some appreciation of the concept of fairness. He further reasoned that this concept was more likely to have relevance for individuals who were morally mature than for those morally immature. As a result, he conducted research in which moral maturity was placed in the role of a moderator variable. He proposed that for morally mature subjects, equity predictions would hold but that equity theory would be less useful in predicting the behavior of morally immature subjects. The results supported Vecchio's hypotheses.

From a cognitive perspective, Vecchio's findings are very exciting. There are two predominant theories of moral development - the theories of Piaget (1965) and Kohlberg (1976). Both of these theories place heavy reliance on cognitive development in describing individual differences in moral behavior. Higher levels of cognitive development imply greater maturity in situations involving moral judgment. The point is that moral judgement often involves some rather abstract and subtle concepts. The "right" decision or the choice of the "best" strategy often involves high levels of syllogistic reasoning and rule application. Thus, it

would not be surprising to find that people who have attained high levels of cognitive development are better able to apply equity propositions than those who have not achieved these levels. In our opinion, the moderator variable that improved Vecchio's predictions was level of cognitive development rather than some social-personality construct such as conventional morality. Equity theory embodies some very ambitious assumptions about the reasoning capacities of humans. It follows that equity predictions would be best supported in populations of subjects who possess those capacities. Vecchio was able to isolate those individuals. We would encourage a substantial examination of other, similar, measures of cognitive development and functioning in order to assess the extent to which such variables constrain equity predictions.

#### The "half-life" of equity perceptions

The second research line that represents a novel approach to equity predictions can be found in a recent study by Greenberg and Ornnstein (1983). These researchers set out to examine the effect of outcomes other than money on perceived equity. This was a reasonable avenue to pursue since it has generally been accepted that equity theory does (or should) transcend particular types of outcomes (such as money) and apply to outcomes in the generic sense. In this particular study, a title was used as a reward. Some subjects received a title as a reward for excellent work, others received a title capriciously regardless of level of performance, and others were asked to do extra work implied by the title but were never given the title. The results demonstrated clearly that titles have many of the same properties as more concrete rewards such as money. From our perspective, however, the results also

demonstrated something startling with respect to equity perceptions. Greenberg and Ornnstein discovered that for the group of subjects who were given a title yet were aware that they had not earned that title, there was a radical alteration of equity perceptions over a relatively brief period of time. The first reaction of the unearned title group was one of satisfaction. They were pleased to receive the title and, as traditional equity theory would predict, increased their output as if to reduce the tension created by the "overpayment" condition. But what followed shortly after that reaction was a reversal of this effect. Satisfaction was drastically reduced and productivity similarly declined. The researchers concluded that the subjects might have felt that they were being duped into working harder by the unearned title. This might be called the "Tom Sawyer" phenomenon - tricking someone into helping you paint the fence. From this perspective, the title became an input rather than an outcome and the subjects would have resented being "fooled" into doing extra work.

There are two interesting points to derive from this study. The first, and most dramatic, is that without any external intervention or treatment, perceptions changed. This implies that the cognitive activity continued after the initial calculation of equity. This possibility has been seldom discussed in the equity literature. It is assumed that once the individual determines the relative equity of the situation, a choice is made and equity is not "recalculated". These data suggest a very different process, one much more dynamic than had been previously assumed. Additionally, these data suggest that the identification of something as an outcome or an input is relative, both between and within individuals. The first author considers the opportunity to add five

miles on to a ten mile run a "reward"; the second author would feel punished with the ten mile run let alone the additional five. Inouts and outcomes are idiosyncratic. The Greenberg and Orrnstein finding implies that much more needs to be known about the time-course of equity perceptions. There has been little if any research that informs us with respect to how long inequity perceptions persist and what conditions influence their dissipation.

The phenomenon discovered by Greenberg and Orrnstein is one that is receiving substantial attention in more traditional cognitive research, particularly in the area of memory and concept formation. As an example, the work of Loftus on memory for events (1975) as well as the work of Bransford and Franks (1971) on memory for prose suggests that the computer analogue for describing cognitive activity may not be a good one. In the computer metaphor, information is stored and retrieved in isomorphic form. In contrast, in what might be called the "constructivist" metaphor, information goes in, is transformed and then retrieved. To this point, equity research has been oriented toward events in the external environment as explanatory mechanisms for the presence or absence of tension, i.e. tension can be created or dissipated through manipulation of outcomes. This is almost behaviorist in tone. The results of Greenberg and Orrnstein suggest that the search for understanding must turn to internal mental representations as well in order to understand the more dynamic aspects of equity perceptions.

#### Adjustment Equity

One of the questions that has often surfaced in equity research has been the base level at which an individual starts calculating equity. For example, if you and I both work for the same organization and we

both make a substantial contribution, should we both get the same dollar amount as a bonus or should we each get a bonus that is the same percentage of our base salary. In the former situation, if we had both done an outstanding job, we might both receive \$1000. This would be known as absolute equity. In the latter situation, assuming that my base salary was \$20,000 and yours was \$30,000, our bonus might be 5% of base salary, in which case I would receive \$1000 and you would receive \$1500. This is known as relative equity. Clearly, the answer to this question is at least as important as the estimation of inputs and outcomes in determining perceived fairness. If individuals calculate equity on a percentage basis, "absolute equity" would be perceived as inequitable by some individuals. On the other hand, if equity is calculated on an absolute basis, then a system based on rewards geared toward a percentage of base salary would be perceived as inequitable.

Recent work by Birnbaum (1983) and Mellers (1982) suggests that the truth lies somewhere in between. It appears as if individuals use a much broader equity scale than either of those suggested above. It has been labeled adjustment equity and implies that an individual has long-term parity in mind in work situations rather than short-term considerations. Adjustment equity assumes that individuals seek to place themselves in the same ordinal position on a scale of outcomes as they perceive themselves to occupy on a scale of merit. Further, adjustment equity implies that individuals see this as a goal to work toward over time rather than to accomplish in one large step or adjustment. In some senses, the type of mechanism suggested in adjustment equity implies that a good deal of the earlier equity research has been looking at too short a time frame and too restricted a scale of both outcomes and

inputs. As a result, the data may not have seemed particularly favorable toward equity predictions when in fact, support might have been there all along had we only known what perspective to consider. The work of Birnbaum and Mellers strongly suggests that we need to consider alternative definitions of equity that more closely match the calculating heuristics of our subjects.

### Expectancy Theory

Expectancy theory is built on a cognitive paradigm. It suggests that individuals consider alternatives, weigh costs and benefits and choose a course of action of maximum utility. The general model proposes that the force on a person to engage in a particular action is a multiplicative function of valence, instrumentality and expectancy. Although that model seems relatively straightforward, some recent research has suggested that we need to know a good deal more about the cognitive operations than we know presently.

### Number of Outcomes

One line of research that seems profitable is related to the nature of the outcomes considered. At least two aspects of these outcomes have been examined: a) the number of alternative outcomes and b) the extent to which the outcomes are positive or negative. In a study of the number of outcomes considered, Leon (1979) discovered that as the number of outcomes increased, the accuracy of prediction using expectancy propositions decreased. In other words, as the number of different outcomes or end states increases, the potential for predicting which outcome will be chosen decreases. This is true for ranges of outcomes from 5 through 15. Leon came to this conclusion after a meta-analysis of 31 expectancy studies. This should come as no surprise to the student of

cognitive processes. Miller (1956) demonstrated long ago that effective information processing (and in particular simultaneous discrimination) occurred in the stimulus range of  $7 \pm 2$ . Thus, it should be obvious that there would be a decline in the efficiency with which individuals apply computational heuristics as the number of alternatives being considered increases beyond the range of 9. Presumably, this processing handicap could be eliminated if individuals were permitted or encouraged to chunk or cluster outcomes prior to comparison. Thus, even though the basic expectancy theory propositions are silent with respect to the effect of number of outcomes, both theory and data suggest a limit to the effective comparison of outcomes.

#### Positive vs. Negative Outcomes

Leon also conducted research on the effect of outcome valence on predictive accuracy in the expectancy paradigm. Again, his results suggest an important limit to the efficiency of the expectancy model. In a study comparing the manner in which positive and negative outcomes are combined, Leon (1981) discovered that they have quite different effects. Positive outcomes are combined in the manner suggested by the theory. There seems to be a positive linear relationship between the (positive) valence of the outcome and the force on the individual to choose that outcome. In other words, when positive outcomes are involved, more is better. The same relationship does not hold however when negative outcomes are involved. The decision process seems to be much more primitive. When negative outcomes are involved, it does not seem to matter how negative they are. In other words, the extent of negativity is not related to the force to avoid that outcome - more is not worse. The case of negative outcomes seems to be all or none.



This should come as no surprise. We know from other research paradigms that negative information is treated differently. For example, in the employment interview, negative information is often given a disproportionately large weight in making final decisions (Webster, 1982). Similarly, in gambling situations it is commonly the case that individuals devote disproportionate time (and decrease final utility) by avoiding losses at any cost. Once again, Leon has demonstrated that the basic propositions of expectancy theory need to be modified to account for a unique information processing strategy.

#### Combinatorial Rules

The expectancy model is based on the proposition that individuals can combine information about valences and expectancies in a multiplicative manner. Multiplicative combination is a demanding operation and several researchers have examined this proposition. The results are not particularly encouraging. Stahl and Harrell (1981) discovered that some individuals do use multiplicative rules as the theory suggests but other uses additive rules. In other words, for some people, the force on them to choose a particular outcome is the simple sum of valences and expectancies. It is conceivable that an individual might choose an outcome that has a very high valence but little probability of occurrence using an additive rule. Such a choice would be much less likely using multiplicative rules for combining valences and expectancies. Thus, in spite of the fact that additive rules can occasionally run counter to the notion of rational economic man (*homo algebraicus*) suggested by expectancy theory, these suboptimal rules are still used (*homo heuristicus*). Perhaps this is what Simon and March had in mind when they introduced the notion of limited rationality. In Stahl

and Harrell's study, only 37% of the subjects used the multiplicative rule for making a choice; the other 63% used the additive rule.

It seems to be the case that many of the motivational models demand substantial cognitive skills on the part of the person being considered. We have already seen hints of this in the earlier discussion of equity theory in the work of Vecchio on moral maturity. It seems equally plausible that expectancy theory is an appropriate motivational framework for only some subset of the population. Many studies in decision making have illustrated that interactive processing (i.e. the use of multiplicative rules of combination) is difficult for many people (Slovic, Fischhoff and Lichtenstein, 1977). Zedeck (1977) has taken this logic a step further and identified many different strategies that individuals use for combining information suggesting that the simple multiplicative and additive models tested by Stahl and Harrell are only a subset of a larger array of strategies.

It is clear that we need to know more about how individuals combine information in assessing alternative outcomes. It is not sufficient to know that individuals are different; we need to know why they are different or under what circumstances they will act differently. Both Stahl and Harrell and Zedeck imply that there are stable individual differences in how information is combined - some people use one set of rules and some people use another. There are other possibilities as well. For example, Shiflett and Cohen (1982) have demonstrated that the role of valence, instrumentality and expectancy changes as a function of whether you are trying to predict satisfaction, effort or intention to act in a particular manner. This finding suggests that there are intra-individual differences in combination rules. Kopelman (1979) has

demonstrated a similar phenomenon in examining expectancy theory predictions of behavior vs. satisfaction. He found that the orthodox multiplicative model of  $V \times E$  did a good job of predicting behavior but that a subtractive model,  $E - V$  did a better job of predicting satisfaction.

From the earlier discussions of outcomes (i.e. number and positive vs. negative), it occurs to us that other explanations are possible for the extent to which individuals use multiplicative vs. additive vs. other rules in assessing outcomes. For example, it is possible that as the number of outcomes increases, individuals are likely to use simpler (e.g. additive rules). In Leon's review of the "number-of-outcomes" literature (1979), he could not explore the possibility that although the traditional expectancy model was less accurate with more outcomes, a simpler model would have yielded increased accuracy. Similarly, with respect to the assessment of positive and negative outcomes, Leon (1981) discovered that these two types of outcomes are assessed quite differently. Negative outcomes have a more dramatic effect on decisions, functioning in what seems to be an all-or-none manner. This might be considered as a situational or moderator variable affecting observed individual differences in outcomes assessment. It may be that if only positive outcomes are being considered and if there are fewer than nine of these outcomes, we are all able to use multiplicative rules reasonably well. On the other hand, if there are negative outcomes and/or there are more than nine outcomes to consider, the cognitive demand becomes substantially greater and the predictive efficiency of the multiplicative model degenerates for some individuals.

The discussion above suggests that there are many different variables that need to be considered when examining the proposed multiplicative process that is fundamental to the orthodox expectancy models. These variables might include individual differences in cognitive skills, the number of outcomes, the valence of outcomes and particular dependent variable chosen for study (i.e. choice, affect, or behavior). The key to improving the predictive efficiency of the expectancy model might lie in any or all of these variables. What is needed is a systematic program of research geared toward exploring the way in which individuals combine different types of information.

#### Summary

It seems clear to us that there is a substantial amount of basic work that needs to be done in understanding how cognitive abilities and processes fit into the various motivational models. In spite of the fact that both equity theory and expectancy theory purport to be "cognitive" models of motivation, they do not tell us much about what cognitive processes are operating and what the boundary conditions to those processes are. Although most need theories would not claim to be cognitive, there is opportunity for cognitive research within the bounds of these theories as well. Although we will not detail the possibilities here, it is obvious that goal setting theory provides many opportunities for the exploration of cognitive processes. In the recent review of goal setting research by Locke and his colleagues (Locke, Shaw, Saari and Latham, 1981), variables such as choice of strategy and knowledge of results play a major role in behavior. These are clearly cognitive in nature.

Similarly, many of the operant studies being conducted now show clear evidence of cognitive influence. This evidence is demonstrated in two particular ways. First, when subjects are told about an impending change in a reinforcement schedule or system, behavior changes very rapidly, more rapidly than one might expect from a straight contingency perspective. As an example, in a study of sales behavior conducted by Luthans, Paul and Baker (1981), on the day that an attractive contingent reinforcement schedule was introduced, behavior changed dramatically, in spite of the fact that rewards would not be dispensed until several days or weeks later. A second anomaly appeared in the same data and might also be raw material for additional cognitive analysis. During the post-intervention period, in spite of the fact that reinforcement had been suspended, the behavioral change remained strong. This is quite different than the situations usually encountered in behavior modification programs directed toward such activities as eating or smoking or being on time. In these latter situations, recidivism is rampant and positive behaviors disappear as soon as reinforcement is terminated. The point is that something unusual is happening here and that "something unusual" is most likely cognitive in origin. It can't be that the subjects are simply too dumb to realize that rewards have been suspended. Instead, they must now "realize" the long term value of behaving in particular ways. This realization must be something more substantial than simply "developing a new operant". Certainly, the growing empirical support for the mechanisms of social learning theory and modeling suggest a broad cognitive arena for research in a neo-behaviorist paradigm. There is not a single motivational approach currently available that could not benefit from research dedicated to

uncovering cognitive mechanisms implied by the components or processes of the particular approach.

### Middle-Range Theories

In a recent book, Pinder (1984) describes the pitfalls of universal theories of work motivation. We described the problems with this universalist approach earlier in the essay. As a potential solution to this problem, Pinder suggests the development of middle-range theories. By this, he means that instead of developing new theories to deal with all behaviors, instead, we should concentrate on developing less ambitious theories that deal with a limited range of behavioral phenomena. This less ambitious form of theory is given the name middle-range theory. Pinder's notion of how these theories would be developed revolves around a matrix that combines situations with motivational types. He suggests that within a given situation, there are a limited number of styles of motivational response. These styles of response can be best understood as the parameters that define motivational subgroups of individuals. For example, in one type of situation (e.g. making decisions under time constraints), a particular motivational strategy might be adopted by members of one subgroup but not by members of a different subgroup. Similarly, one particular motivational subgroup might systematically vary their motivational strategy across a range of work contexts or situations. Pinder suggests that approaches such as those proposed by Owens and Schoenfeldt (1979) for identifying types or clusters of individuals based on biodata might be a good way to start identifying these motivational subgroups.

There is much to admire about Pinder's suggestion. It should be obvious to even the casual observer of motivational theory and research that there is little hope of identifying a universal theory of motivation. Thus, middle-range theories make perfect sense. We would like to suggest a very different type of middle-range theory, however. Instead of a type X situation matrix, we would propose that various motivational approaches are better suited to predicting particular dependent variables. Pinder implies that it may be necessary to develop a new "set" of middle-range motivational theories. We would like to suggest that we have all of the theories that we need right now and that they have been unwittingly developed as middle-range theories. In this section, we will attempt to illustrate that point by looking at the dependent variables and/or designs most often employed in the tests of particular theoretical approaches. As an example, Guest (1984), in a recent review of new developments in theories of work motivation, notes that expectancy theory seems to work best in situations in which individuals are making occupational and/or organizational choices. He further suggests that expectancy theory works best in situations in which there are few constraints on the range of alternatives being considered. Thus, he proposes that expectancy theory would not do well in predicting work behavior (e.g. quality or quantity of performance) because there are often constraints on the range of this behavior, the constraints imposed by work methods, supervision methods and work contexts.

We are in agreement with both Pinder and Guest with respect to the observation that current motivation theories are expected to do too much, to predict too wide a range of dependent variables. Our approach

to this issue has been to identify the dependent variables that are typically studied in various tests of motivational approaches and assume that there is a sort of inchoate realization of the appropriate range of the particular theory. In other words, researchers seem to recognize, almost intuitively, the type of dependent that makes most sense in testing a particular theory of motivation. In a sense, we are suggesting that one can almost induce the thrust of a theory by looking at what it attempts to predict or explain. Below, we will briefly review the common motivational approaches from this perspective. This section may require more tolerance on the part of the reader than any other. It is highly stylized and clearly represents our opinion rather than the results of a careful literature review. It is our feeling that certain dependent variables are more amenable to study than others from particular motivational frameworks. We think that this is the thrust of people like Pinder who are suggesting middle-range theory. Our suggestions should be considered as additional to those of people like Pinder and Guest rather than as alternative positions.

#### Need Theory

By far, the most common dependent variable in studies of need theory has been satisfaction. This should not be particularly surprising since the very term need theory is often used as a short hand reference - the more complete label (at least historically) being need satisfaction theory. The early work of Schaffer (1953), Herzberg et al. (1959) and most recently Alderfer (1972) clearly emphasizes the use of reported satisfaction as the appropriate response to be predicted by their respective theories. In addition, those who apply Maslow's theory



to work settings have also chosen to concentrate on reported satisfaction as the raw material for testing the need hierarchy.

Similarly, those who have attempted to refute need type theories have typically gathered data suggesting that levels of satisfaction (either facet satisfaction or overall satisfaction) cannot be predicted from knowledge of individual need strength and need satisfaction. Although the relationship between need strength/satisfaction and reported satisfaction is, at best, arguable, the data relating need strength/satisfaction to other behaviors such as productivity, job choice, effort expenditure or absenteeism and turnover is less equivocal. Need theories seem to be poor choices for predicting these other dependent variables. This is to be expected given the loose or non-existent connections between the major variables in these need theories and observable behavior. At best, the typical need theory assumes a hedonic mechanism that moves people toward satisfying environments and away from aversive ones. Nevertheless, little has been done in the way of articulating how these approach and avoidance mechanisms might manifest themselves in the form of varied work productivity or amount of effort expended or job choice. The recent models of absenteeism (e.g. Steers and Rhodes, 1978) or turnover (Mobley, Horner and Hollingsworth, 1978) have little to say about need strength or satisfaction directly. In their models, need structures play an indirect role in withdrawal, influencing the process through perceived satisfaction.

The simple conclusion that one might draw from a review of need theories of motivation is that if they have any value at all, their "acceptable range" of predictability is limited to understanding or

predicting affective reactions to various job characteristics. The links between these reactions and other behaviors (e.g. effort, productivity, choice or withdrawal) are complex and must be supported with alternative theoretical frameworks.

### Equity Theory

Research on equity theory propositions has usually revolved around two issues: 1) the tension or distress experienced by individuals who find themselves in inequitable situations and, 2) the strategies that individuals use to eliminate or reduce this tension or distress. Typically, dissatisfaction is the central focus of equity research. Although there has been a consistent effort to demonstrate that felt inequity has predictable consequences for performance quality and quantity, such demonstrations have been few and far between.

Goodman and Friedman (1971) chided researchers for studying anything other than perception processes. They contend that equity theory was never intended to be anything more than an account of how people assign affective meaning to individual/environment interactions. Certainly, it was never intended to predict productivity levels. Goodman and Friedman also used the framework to study choice behavior, in particular the range of choices that individuals have available to them in identifying significant or referent others.

There have been some attempts to demonstrate that inequity is related to avoidance and withdrawal behaviors. It is common to think of quitting when you discover that a co-worker received a particular benefit that you were denied (e.g. a promotion, a bonus, a special assignment). To the extent that the tension produced by inequity is aversive, it would make sense to avoid or leave the situation causing

that tension. In a recent study by Croyle and Cooper (1983) it was demonstrated that dissonant cognitions produce psychophysiological arousal (as measured by galvanic skin response). If all dissonance is arousing (and aversive), we can assume that one strategy that might be employed to reduce that arousal would be avoidance (or withdrawal). Dittrich and Carrell (1979) did find that employee perceptions of equitable treatment were stronger predictions of absence and turnover than were measures of job satisfaction. On the other hand, as was the case with need theory, current models of absence and turnover place only modest emphasis on satisfaction (or dissatisfaction).

If the relationship between perceived inequity and physiological arousal can be shown to be a robust one, there might be some reason to examine effort expenditure as a dependent variable in equity research. This would make sense from a strictly physiological perspective.

Based on the research literature surrounding tests of equity theory, we would propose that this approach carve its middle range out of the affective domain. As was true with need theory, it would seem that equity theory is best suited to explaining the affective reactions that result from perceptions of equity. There might also be some value in considering the implications of perceived equity for effort expenditure. On the other hand, there seems to be little compelling logic for pursuing work performance as a dependent variable in equity research.

#### Reinforcement Theory

There are a number of clear trends in research employing the behaviorist paradigm. For example, there is virtually no interest in satisfaction as a dependent variable. This makes sense since the

behaviorists are uninterested in "mental events". There have been some exceptions but they have been few and far between. As an example, Latham and his associates were active researchers in the behaviorist paradigm prior to their shift of allegiance to goal setting theory. During that orthodox behaviorist period, they would occasionally ask subjects about their satisfaction with various reinforcement schedules (though less often about their satisfaction with the work they were performing). The classic behaviorist study including job satisfaction as a dependent variable was conducted by Cherrington, Reitz and Scott (1971). In that study, the fickle nature of satisfaction-performance relationships was illustrated. It was demonstrated that it was possible to have low performance and high satisfaction as a result of the reward schedule. For many researchers inclined toward the behaviorist world view, this was all the information they needed to exclude satisfaction from the domain of interesting dependent variables since it had questionable or irrelevant implications for the control of "real" behavior.

Another clear trend in "behaviorist" research in the motivational arena is the concentration on discrete behaviors to control, predict or understand. Favorites are absenteeism, tardiness, and accident rates. The behaviorist approach is also one of the most common for studying traditional aspects of performance. These include quality, quantity, and persistence. Typically, the behaviors to be considered are discrete parts of larger jobs rather than broad parameters of those jobs. Thus, researchers might study the number of arithmetic problems completed, the number of computer cards sorted, the accuracy of cashiers in using the cash register, the number of beavers trapped, the number of trees planted, or the number of words read per unit time. Although the

behaviorist approach suggests itself as appropriate for the examination of effort expenditure, effort is seldom chosen as a dependent variable. If one were to choose a "modal" dependent variable it would most likely be the frequency of particular discrete behaviors per unit time, conceptually identical to the rate of bar pressing so that so captivated Skinner in the late 30s.

Choice behavior is seldom the dependent variable in behaviorist research. Thus, one should not expect to see studies involving occupational or organizational choice among behaviorist studies. Similarly, one is unlikely to see "intentions" as behavior to be predicted in the orthodox behaviorist paradigm, in spite of the fact that intention to quit or intention to be absent have been identified as central to actual quits or absences.

Thus, from the middle-range perspective, the behaviorist or reinforcement paradigm would seem best suited to non-cognitive, discrete and well bounded behaviors. These behaviors must be amenable to specification (for the subject) and careful measurement (for the researcher). One is tempted to use the word "small" in describing the nature of the dependent variables of interest.

#### Expectancy Theory

In spite of the fact that expectancy researchers have examined a full range of dependent variables, empirical research and theoretical propositions seem to point clearly at choice as the variable of interest. Most theoretical statements of expectancy propositions deal with the force on an individual to choose one course of action over another, or to prefer one strategy to another, or to intend to behave in one way rather than another. Wanous, Keon and Latack (1983) go so far as

to suggest that expectancy theory is best at predicting discrete choices (e.g. which of several occupations or organizations) rather than observed levels of some dependent continuum (e.g. eventual performance or effort expenditure level). They seem to be saying that to the extent to which an individual has a clear choice among a number of outcomes or levels, expectancy theory can do a good job of predicting that choice. On the other hand, if there is no choice implied in the action or the choice is not clearly discrete, then expectancy theory may not be helpful in understanding the behavior in question. Unfortunately, researchers have not always been clear about what was the appropriate dependent variable for expectancy research. Thus, for example, although Peters (1977) suggests that effort is the dependent variable of interest the dependent variable turns out to be the choice that individual subjects made about staying in or leaving an experimental situation.

Wanous et al. (1983) stress another aspect of expectancy research that might be revealing. They suggest that expectancy models work best when there is sufficient time for the individual to consider all of the alternatives from the perspective of costs and benefits. A common criticism of expectancy theory has been that it is unlikely that individuals actually carry out all of the complicated calculations implied by most expectancy models. Wanous et al. would seem to agree. They imply that expectancy mechanisms only come into play when there is a period for reflection on the possible outcomes. Since occupational and organizational choice are usually made over a substantial period of time (days, weeks or months), expectancy theory would seem well suited to the choice. On the other hand, in the midst of a conversation with a

supervisor, the choice between acting in a respectful or rude manner is unlikely to be understood using traditional expectancy propositions.

Guest (1984) makes some similar observations about the value of expectancy theory. He suggests that expectancy theory is best suited for understanding "important" decisions or, at least, those that capture the attention of the individual. This latter notion is an interesting one since it introduces a very different construct into the motivational sequence (i.e. attention), but one that has been a central part of many other psychological theories. Guest also suggests that expectancy theory will be most useful in explaining choices in situations where the nature of the task and the demands on the worker are clear. It seems fair to say that Guest is suggesting a middle-range role for expectancy theory.

There seems to be some sentiment for excluding satisfaction as a dependent variable in expectancy research as well. Kopelman (1982) and Korman (1976) both dismiss satisfaction as an inappropriate concern for expectancy research. This makes sense from a theoretical perspective as well since Vroom (1964) among others identified anticipated satisfaction rather than actual satisfaction as the affective focal point of his expectancy model. As Shiflett and Cohen (1982) suggested, what you have may determine satisfaction but what you want may determine choice and ultimate behavior.

Although Wanous et al. (1983) emphasize the value of expectancy theory for making decisions with respect to pursuing occupations and joining organizations, the mirror image of that decision would also seem to be amenable to consideration from the expectancy perspective. The decision to leave an organization is equally discrete, implies generous time constraints and is clearly a decision before it is a behavior.

It seems obvious to us that the expectancy theory finds its middle-range value in choice behavior. Circumstances that make any choice difficult would also have a weakening effect on expectancy predictions. Too many outcomes, anxiety caused by potentially aversive outcomes, too short a time for considering outcomes and being required to make choices from a continuous rather than a discrete continuum all suggest less than efficient prediction from the expectancy framework.

### Goal Theory

It is somewhat awkward to consider the appropriate role for goal theory in our middle-range framework. This is because goal theory is undergoing a radical transformation that is not likely to be completed for some time. Locke et al. (1981) trace the careful development of the goal setting paradigm from the late 60's to its present status. In some respects, until recently, goal setting and acceptance was a sterile phenomenon without any supporting theory, resting on broad philosophical statements of people such as Tolman, Ryan and Irwin. It was more the manifestation of a teleological orientation than a theory of industrial behavior. Although there seemed to be little dispute that clear hard goals led to higher levels of performance, there was no ready explanation for the phenomenon.

Recently, Locke and his colleagues have attempted to develop propositions that supply the theoretical anchors that were missing in earlier research (Locke et al. 1983). In addition to the work of Locke and his associates, Bandura (e.g. Bandura and Cervone, 1983) has introduced the construct of perceived self-efficacy into considerations of the effect of goal setting. This latter orientation adds the variable



of satisfaction to the range of acceptable dependent variables. A recent paper by Naylor and Ilgen (1984) describes the underlying theoretical issues in some detail. The point is that a description of the "typical" goal setting study may not do justice to the type of studies currently being conducted or those that will be designed in the next few years. The full "theory" is simply too new to reasonably characterize through a review of empirical research. Nevertheless, it is of some value to see what stages goal setting research passed through on its way to its current position.

An examination of goal setting research conducted over the past 15 years suggests that the actual behaviors studied have been quite specific and bounded, much like the dependent variables in the research of the behaviorists. Typical tasks have involved solving arithmetic problems, checking columns of numbers, sorting computer cards, sorting index cards, generating ideas in a brainstorming session and assembling toys. The tasks have been easy to present to naive subjects, performance has been easy to record and the tasks have been amenable to laboratory settings and samples of convenience. There have also been field tests of goal setting predictions involving tasks such as hauling logs, planting trees and trapping beaver but these tasks have also been simple rather than complex with the added advantage of being easy to measure. Although this is a characterization that some might find offensive, it would seem that those who had been interested in reinforcement theory became interested in goal setting theory. Perhaps this was the result of a disenchantment with the limitation of radical behaviorism to the role of a technology rather than that of a theory (Locke, 1980). Perhaps it was a desire to conduct research in a paradigm that allowed for cognitive

events and capacities. Nevertheless, it would appear that having made the philosophical transition from behaviorism to goal setting theory, it is now time to make the operational switch and begin to consider "bigger" behavioral sequences than has typically been the case.

Of all of the theories that we have considered, goal setting theory has the potential for the greatest scope in the context of middle-range theories. It is likely that variables such as job performance, job satisfaction, task satisfaction, and effort expenditure are amenable to explanation from the goal setting perspective. On the other hand, absence and turnover as well as discrete choices from ranges of outcomes (e.g. occupational or organizational choice) would seem less well explained from the goal setting perspective than from expectancy propositions.

#### Concluding Comment

This consideration of the limitations on the "universality" of current theories of work motivation was intended to have several effects on the reader. First, we are agreeing with Pinder that middle-range theories are called for. In addition, we are departing from Pinder's suggestion with respect to how those middle-range theories might be developed. It is our opinion that we have the theories we need right now. The only thing necessary is to realize the limits of those theories. The point that we have tried to make is that you might choose your theory based on the dependent variable that is of interest. In fact, we have tried to demonstrate that just such a process occurs now and is evident in the empirical research literature.

The next step, of course, is to combine various theoretical approaches to form additional middle-range theories. This is being done

now as well. The merging of expectancy theory and goal setting theory is well advanced (Landy, 1985). Similarly, it would seem reasonable to combine need theory and equity theory in order to provide more structure to the equity calculation process. To this point, it has been assumed that all rewards are equally salient to all people. Other combinations are possible and likely to provide theoretical and practical insights. Consider either half of the 5 X 5 matrix of theoretical approaches considered in this paper. Every cell in that matrix suggests a new theory. One might combine need theory with reinforcement theory, expectancy theory with equity theory, etc. It is likely that many of those combinations will have the capacity to predict broader and more encompassing behavioral sequences than either theory alone. Finally, it is possible that each of these theoretical approaches might play a role in a broad meta-theory of motivation, as we have suggested elsewhere (Landy and Becker, 1983; Landy, 1985).

These, then, are our reflections on modern motivation theories. We firmly believe that we have all theory and data we need right now. What is needed is a novel reorganization of those theories and data. We hope that we have suggested some of the characteristics of that reorganization in this essay. We believe that adaptive motivation theory was a good start at a novel reconceptualization. Further, it seems to us that sufficient evidence of multiple operating motivational frameworks was uncovered in the course of examining the propositions of adaptive motivation theory to warrant skepticism regarding traditional universalist motivation theories. It may now be appropriate to pursue some fine-grained research topics imbedded in each of the modal

motivational approaches. We have tried to identify some of these fine-grained topics in this report.

## REFERENCES

- Adams, J. S. (1965). Inequity in social exchange. In L. Berkowitz (Ed.), Advances in experimental social psychology, Volume 2, 267-299. New York: Academic Press,
- Alderfer, C. P. (1972). Existence, relatedness and growth: Human needs in organizational settings. New York: Free Press.
- Atkinson, J. W. (1964). An introduction to motivation. New York: Van Nostrand Reinhold.
- Bandura, A. (1969). Principles of behavior modification. New York: Holt, Rinehart and Winston.
- Bandura, A and Cervone, D. (1983) Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. Journal of Personality and Social Psychology, 45, 1017-1028.
- Birnbaum, M. H. (1983) Perceived equity of salary policies. Journal of Applied Psychology, 68, 49-59.
- Bolles, R. C. (1975). Theory of Motivation (2nd Ed.). New York: Harper and Row.
- Bransford, J. D. and Franks, J. J. (1971). The abstraction of linguistic ideas. Cognitive Psychology, 2, 331-350.
- Campbell, J. P. and Pritchard, R. D. (1976). Motivational theory in industrial and organizational psychology. In M. D. Dunnette (Ed.) Handbook of industrial and organizational psychology. Chicago: Rand-McNally.
- Cherrington, D. J., Reitz, H. J. and Scott, W. (1971). Effect of contingent and noncontingent reward on the relationship between job satisfaction and task performance. Journal of Applied Psychology, 53, 531-536.

- Croyle, R. T. and Cooper, J. (1983). Dissonance arousal: Physiological evidence. Journal of Personality and Social Psychology, 45, 782-791.
- Dewsbury, D. A. (1978). Comparative animal behavior. New York: McGraw-Hill.
- Dittrich, J. E. and Carrell, M. R. (1979). Organization equity perceptions, employee job satisfaction and departmental absence and turnover rates. Organizational Behavior and Human Performance, 24, 29-40.
- Festinger, L. (1957). A theory of cognitive dissonance. Evanston, Ill.: Row, Peterson.
- Georgopolous, B. S., Mahoney, G. M. and Jones, N. W. (1957). A path-goal approach to productivity. Journal of Applied Psychology, 41, 345-353.
- Goodman, P. S. and Friedman, A. (1971). An examination of Adams' theory of inequity. Administrative Science Quarterly, 16, 271-288.
- Greenberg, J. and Ornstein, S. (1983). High status job title as compensation for underpayment: A test of equity theory. Journal of Applied Psychology, 68, 285-297.
- Guest, D. (1984). What's new in motivation. Personnel Management, May, 20-23.
- Hall, D. and Nougaim, K. E. (1968). An examination of Maslow's need hierarchy in an organizational setting. Organizational Behavior and Human Performance, 3, 12-35.
- Herzberg, F., Mausner, B. and Snyderman, B. (1959). The motivation to work. New York: Wiley.
- Jaques, E. (1961). Equitable payment. New York: Wiley, 1961.

- Kleinginna, P. R. and Kleinginna, A. M. (1981). A categorized list of motivation definitions with a suggestion for a consensual definition. Motivation and Emotion, 5, 263-292.
- Kohlberg, L. (1976). Moral stages and moralization: The cognitive developmental approach. In T. Lickona (Editor), Moral development and behavior: Theory, research, and social issues. New York: Holt, Rinehart and Winston.
- Kopelman, R. E. (1979). Directionally different expectancy theory predictions of work motivation and job satisfaction. Motivation and Emotion, 3, 299-317.
- Korman, A. K. (1971). Industrial and organizational psychology. Englewood Cliffs, N. J.: Prentice Hall.
- Korman, A. K. (1976). Hypothesis of work behavior revisited and an extension. Academy of Management Review, 1, 50-63.
- Landy, F. J. (1985). The psychology of work behavior, 3rd Edition. Homewood, Ill.: Dorsey Press.
- Landy, F. J. and Becker, W. (1982). Adaptive motivation theory. Annual Report to Office of Naval Research. University Park, Pa.: Department of Psychology.
- Landy, F. J. and Trumbo, D. A. (1976). The psychology of work behavior. Homewood, Ill.: Dorsey Press.
- Landy, F. J. and Trumbo, D. A. (1980). The psychology of work behavior, 2nd Edition. Homewood, Ill.: Dorsey Press.
- Lawler, E. E. and Suttle, J. L. (1972). A causal correlational test of the need hierarchy concept. Organizational Behavior and Human Performance, 7, 265-287.
- Leon, F. R. (1979) Number of outcomes and accuracy of prediction in

- expectancy research. Organizational Behavior and Human Performance, 23, 251-267.
- Leon, F. R. (1981). The role of positive and negative outcomes in the causation of motivational forces. Journal of Applied Psychology, 66, 45-53.
- Locke, E. A. (1980). Latham vs. Komaki: A tale of two paradigms. Journal of Applied Psychology, 65, 16-23.
- Locke, E. A., Shaw, K. N., Saari, L. M. and Latham, G. P. Goal setting and task performance: 1969-1980. (1981). Psychological Bulletin, 1981, 90, 125-152.
- Loftus, E. (1975). Eyewitness testimony. Cambridge, Mass.: Harvard University Press.
- Luthans, F., Paul, R. and Baker, D. (1981). An experimental analysis of the impact of contingent reinforcement on sales persons' performance and behavior. Journal of Applied Psychology, 66, 314-323.
- McClelland, D. C. (1955). Some social consequences of achievement motivation. In M. R. Jones (Ed.), Nebraska Symposium on Motivation Lincoln: University of Nebraska Press.
- Mahoney, M. J. (1974). Cognition and behavior modification. Cambridge, Mass.: Ballinger.
- Maslow, A. (1943). A theory of human motivation. Psychological Review, 50, 370-396.
- Mellers, B. A. (1982). Equity judgment. A revision of Aristotelian views. Journal of Experimental Psychology: General, 111, 242-270.
- Mento, A. J., Cartledge, N. D. and Locke, E. A. (1980). Maryland vs. Michigan vs. Minnesota: Another look at the relationship of



- expectancy and goal difficulty to task performance. Organizational Behavior and Human Performance, 25, 419-440.
- Miller, G. A. (1956). The magical number seven plus or minus two: Some limits on our capacity for information processing. Psychological Review, 63, 81-97.
- Mobley, W. H., Horner, S. O., and Hollingsworth, A. T. (1978). An evaluation of precursors of hospital employee turnover. Journal of Applied Psychology, 63, 408-414.
- Naylor, J. C. and Ilgen, D. R. (1984). Goal setting: A theoretical analysis of a motivational technology. (1984). Research in Organizational Behavior, 6, 95-140.
- Owens, W. A. and Schoenfeldt, L. F. (1979). Toward a classification of persons. Journal of Applied Psychology, 569-607.
- Peak, H. (1955). Attitude and motivation. In M. R. Jones (Editor), Nebraska Symposium on Motivation. Lincoln: University of Nebraska Press.
- Peters, L. H. (1977) Cognitive models of motivation, expectancy theory, and effort: An analysis and empirical test. Organizational Behavior and Human Performance, 20, 129-148.
- Piaget, J. (1965). The moral judgement of the child (Trans. Marjorie Gabain). New York: Free Press.
- Piaget, J. (1970). Genetic epistemology. New York: Norton.
- Pinder, C. C. (1984). Work Motivation. Glenview, Illinois: Scott Foresman.
- Rauschenberger, J., Schmitt, N. and Hunter, J. E. (1980). A test of the need hierarchy concept by a Markov model of change in need strength. Administrative Science Quarterly, 25, 654-670.

- Rogers, C. R. (1951). Client-centered therapy: Its current practice, implications and theory. Boston: Houghton-Mifflin.
- Rotter, J. B. (1955). The role of the psychological situation in determining the direction of human behavior. In M. R. Jones (Editor). Nebraska Symposium on Motivation. Lincoln: University of Nebraska Press.
- Schaffer, R. H. (1953). Job satisfaction as related to need satisfaction in work. Psychological Monographs, 67, No. 304.
- Shiflett, S. and Cohen, S. L. (1982). The shifting salience of valence and instrumentality in the prediction of perceived effort, satisfaction and turnover. Motivation and Emotion, 6, 65-78.
- Skinner, B. F. (1938). The behavior of organisms. Englewood Cliffs, N.J.: Prentice-Hall.
- Skinner, B. F. (1959). Cumulative record. New York: Appleton-Century-Crofts.
- Slovic, P., Fischhoff, B., and Lichtenstein, S. (1977). Behavioral decision theory. Annual Review of Psychology, 28, 1-39.
- Stahl, M. J. and Harrell, A. M. (1981). Effort decisions with behavioral decision theory: Toward an individual differences model. Organizational Behavior and Human Performance, 27, 303-325.
- Steers, R. M. and Rhodes, S. R. (1978). Major influences on employee attendance: A process model. Journal of Applied Psychology, 63, 391-407.
- Veroff, J., Reuman, D. and Feld, S. (1984) Motives in American men and women across the adult life span. Developmental Psychology, 20, 1142-1158.
- Vecchio, R. P. (1981). An individual differences interpretation of the

- conflicting predictors generated by equity theory and expectancy theory. Journal of Applied Psychology, 470-481.
- Vinacke, E. W. (1962). Motivation as a complex problem. In M. R. Jones (Ed.), Nebraska Symposium on Motivation, 10. Lincoln: University of Nebraska Press.
- Wanous, J. P., Keon, T. L. and Latack, J. C. (1983). Expectancy theory and occupational and organizational choices: A review and test. Organizational Behavior and Human Performance, 32, 66-85.
- Webster, E. C. (1982). The employment interview: A social judgment process. Schomberg, Ontario, Canada: SIP Publications.
- Zedeck, S. (1977). An information processing model and approach to the study of motivation. Organizational Behavior and Human Performance, 18, 47-77.

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